

What is claimed is:

1. A disc recording and reproducing device, comprising:
  - a resuming section which resumes, after writing of record data on a disc is interrupted, writing of the record data, which is continuous to the record data of which writing is interrupted, at an additional data region just after an end of a recorded data region that is a region of the record data already recorded on the disc;
  - a first reproduction synchronization signal output section which reproduces the record data recorded on the recorded data region, sequentially extracts a synchronization signal from the reproduced record data, and outputs a first reproduction synchronization signal with a frame having a predetermined length that is sequentially structured by the sequentially extracted synchronization signal;
  - a reliability judging section which only detects a frame having a period that is in accordance with a predetermined standard from the first reproduction synchronization signal, and outputs the frame as a reliability synchronization signal;
  - a synchronization signal phase retaining section which outputs, based on the frame contained in the reliability synchronization signal, a retained phase signal that retains a phase of the frame of the reliability synchronization signal;
  - a second reproduction synchronization signal output section which reproduces the record data recorded on the additional data region, sequentially extracts the synchronization signal from the reproduced record data, and outputs a second reproduction synchronization signal with a frame having a predetermined length that is sequentially structured by the sequentially extracted synchronization signal; and
  - a phase difference measuring section which measures a displacement of frames between the second reproduction synchronization signal and the retained phase signal, as a phase difference.

2. The disc recording and reproducing device according to claim 1, wherein the reliability judging section outputs the reliability synchronization signal when the frame having the period that is in accordance with the predetermined standard is detected from the first reproduction synchronization signal for a predetermined number of times.
3. The disc recording and reproducing device according to claim 2, wherein the phase difference measuring section measures the displacement of the frames between the second reproduction synchronization signal and the retained phase signal as the phase difference, when the frame having the period that is in accordance with the predetermined standard is detected from the second reproduction synchronization signal for a predetermined number of times.
4. The disc recording and reproducing device according to claim 1, wherein the phase difference measuring section outputs the measured phase difference between the second reproduction synchronization signal and the retained phase signal as a correction value; and  
the disc recording and reproducing device further comprises a recording control section which adjusts a timing to write the record data on the additional data region based on the correction value.
5. The disc recording and reproducing device according to claim 4, further comprising a phase difference measurement period measuring section which measures a period from a start of the reproduction of the additional data region until the phase difference is measured, as a measurement period,  
wherein the recording control section judges whether or not to adjust the timing to write the record data on the additional data region based on the measurement period.
6. The disc recording and reproducing device according to claim

4, wherein the measurement of the phase difference is interrupted and the recording control section does not adjust the timing to write the record data, when the phase difference is still not measured after a predetermined period or longer is passed from the start of the reproduction of the additional data region.

7. The disc recording and reproducing device according to claim 4, further comprising a reproduction abnormality detecting section which detects whether or not an abnormality exists in a reproduction state of the reproduced synchronization signal,

wherein the recording control section does not adjust the timing to write the record data on the additional data region when the abnormality is detected in the reproduction state of the synchronization signal while measuring the phase difference.

8. A disc recording and reproducing device, comprising:

a resuming section which resumes, after writing of record data on a disc is interrupted, writing of the record data, which is continuous to the record data of which writing is interrupted, at an additional data region just after an end of a recorded data region that is a region of the record data already recorded on the disc;

a first reproduction synchronization signal output section which reproduces the record data recorded on the recorded data region, sequentially extracts a synchronization signal from the reproduced record data, and outputs a first reproduction synchronization signal with a frame having a predetermined length that is sequentially structured by the sequentially extracted synchronization signal;

a data reliability judging section which only detects a frame containing reliable record data from the first reproduction synchronization signal, and outputs the frame as a reliability synchronization signal;

a synchronization signal phase retaining section which outputs, based on the frame contained in the reliability synchronization signal, a retained phase signal that retains a

phase of the frame;

a second reproduction synchronization signal output section which reproduces the record data recorded on the additional data region, sequentially extracts a synchronization signal from the reproduced record data, and outputs a second reproduction synchronization signal with a frame having a predetermined length that is sequentially structured by the sequentially extracted synchronization signal; and

a phase difference measuring section that measures a displacement of frames between the second reproduction synchronization signal and the retained phase signal, as a phase difference.

9. The disc recording and reproducing device according to claim 8, wherein the data reliability judging section outputs the reliability synchronization signal when the frame containing the reliable data is detected from the first reproduction synchronization signal for a predetermined number of times.

10. The disc recording and reproducing device according to claim 9, wherein the phase difference measuring section measures the displacement of the frames between the second reproduction synchronization signal and the retained phase signal as the phase difference, when the frame containing the reliable data is detected from the second reproduction synchronization signal for a predetermined number of times.

11. The disc recording and reproducing device according to claim 8, wherein the phase difference measuring section outputs the measured phase difference between the second reproduction synchronization signal and the retained phase signal as a correction value; and

the disc recording and reproducing device further comprises a recording control section which adjusts a timing to write the record data on the additional data region based on the correction value.

12. The disc recording and reproducing device according to claim 11, further comprising a phase difference measurement period measuring section which measures a period from a start of the reproduction of the additional data region until the phase difference is measured, as a measurement period,

wherein the recording control section judges whether or not to adjust the timing to write the record data on the additional data region based on the measurement period.

13. The disc recording and reproducing device according to claim 11, wherein the measurement of the phase difference is interrupted and the recording control section does not adjust the timing to write the record data, when the phase difference is still not measured after a predetermined period or longer is passed from the start of the reproduction of the additional data region.

14. The disc recording and reproducing device according to claim 11, further comprising a reproduction abnormality detecting section which detects whether or not an abnormality exists in a reproduction state of the reproduced synchronization signal,

wherein the recording control section does not adjust the timing to write the record data on the additional data region when the abnormality is detected in the reproduction state of the synchronization signal while measuring the phase difference.

15. A disc recording and reproducing device, comprising:

a resuming section which resumes, after writing of record data on a disc is interrupted, writing of the record data, which is continuous to the record data of which writing is interrupted, at an additional data region just after an end of a recorded data region that is a region of the record data already recorded on the disc;

a first reproduction synchronization signal output section which reproduces the record data recorded on the recorded data region, sequentially extracts a synchronization signal from the

reproduced record data, and outputs a first reproduction synchronization signal with a frame having a predetermined length that is sequentially structured by the sequentially extracted synchronization signal;

a synchronization signal phase retaining section which outputs, based on the frame contained in the first reproduction synchronization signal, a retained phase signal that retains a phase of the frame;

a second reproduction synchronization signal output section which reproduces the record data recorded on the additional data region, sequentially extracts a synchronization signal from the reproduced record data, and outputs a second reproduction synchronization signal with a frame having a predetermined length that is sequentially structured by the sequentially extracted synchronization signal; and

a phase difference measuring section which measures a displacement of frames between the second reproduction synchronization signal and the retained phase signal as a phase difference, after a predetermined period is passed after the reproduction of the record data recorded on the additional data region is started.

16. The disc recording and reproducing device according to claim 15, wherein the phase difference measuring section measures the displacement of the frames between the second reproduction synchronization signal and the retained phase signal as the phase difference, when a frame of the reproduction synchronization signal having a period that is in accordance with a predetermined standard is detected after the predetermined period is passed.

17. The disc recording and reproducing device according to claim 15, wherein the phase difference measuring section outputs the measured phase difference between the second reproduction synchronization signal and the retained phase signal as a correction value; and

the disc recording and reproducing device further comprises

a recording control section which adjusts a timing to write the record data on the additional data region based on the correction value.

18. The disc recording and reproducing device according to claim 17, further comprising a phase difference measurement period measuring section which measures a period from a start of the reproduction of the additional data region until the phase difference is measured, as a measurement period,

wherein the recording control section judges whether or not to adjust the timing to write the record data on the additional data region based on the measurement period.

19. The disc recording and reproducing device according to claim 17, wherein the measurement of the phase difference is interrupted and the recording control section does not adjust the timing to write the record data, when the phase difference is still not measured after a predetermined period or longer is passed from the start of the reproduction of the additional data region.

20. The disc recording and reproducing device according to claim 17, further comprising a reproduction abnormality detecting section which detects whether or not an abnormality exists in a reproduction state of the reproduced synchronization signal,

wherein the recording control section does not adjust the timing to write the record data on the additional data region when the abnormality is detected in the reproduction state of the synchronization signal while measuring the phase difference.